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THE

NEW GRAIN WEIGHT.

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1877.



ON THE  
PROPOSAL TO INTRODUCE A NEW GRAIN WEIGHT.

By G. E. PAGET, M.D. F.R.C.P.

IT is understood that the Committee, charged by the Medical Council with the publication of a National *Pharmacopœia*, intend to introduce a new grain, scruple, and drachm, differing in weight from those now in use. This seems to me so unnecessary, and, in respect to the new grain, so extremely objectionable, that I am induced to reprint a few remarks which were published about three years ago in the *British Medical Journal*.

The proposed new grain weight cannot possibly supersede the general use of the standard grain, which has been known for ages as the English grain, and has been recently confirmed and legally established by Act of Parliament. The "Act for legalizing and preserving the restored Standards of Weights and Measures" expressly enacts that "one equal seven thousandth part of such pound Avoirdupois shall be a grain."

To establish a new grain for a limited purpose, in contradiction to this general enactment, seems strangely at variance with recognised principles of legislation;

and the more so when it will inevitably introduce ambiguity and confusion of the most perplexing kind : for, in pathological or physiological investigations two different sets of weights will be equally liable to be used, and the reader of the published results will be perpetually left in doubt as to which had been employed—a doubt which he will have no means of solving.

Moreover, the object attained by the change is no adequate compensation for the attendant and permanent inconveniences. The change is *not* a necessary consequence of adopting the avoirdupois ounce in place of the troy ounce. This desirable change in the ounces may be made without any interference whatever with the use of the standard grain in pharmacy.

I confess I can scarcely believe that a step which has so obvious a tendency to dissociate medical from other sciences, and which will certainly introduce a fresh element of confusion into medical writings, can be deliberately sanctioned by the Medical Council and supported by their authority.

G. E. P.

*Cambridge, June 13th, 1862.*

## REMARKS ON THE INTENDED CHANGE OF THE WEIGHTS USED IN PHARMACY.

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IT is generally understood that the Committee for the Preparation of a National *Pharmacopœia* have come to a resolution to make a complete change in the weights for pharmaceutical purposes. The avoirdupois pound and ounce are to be substituted for the troy pound and ounce, which have hitherto been used in apothecaries' weight; and a new draehm, a new scruple, and a new grain, are to be established.

The former of these changes is manifestly desirable. The avoirdupois pound has, by recent enactment, become the standard imperial weight; and the avoirdupois pound and ounce are those which have long been used in all mercantile transactions, except those of goldsmiths and jewellers. They are the weights which are used by manufacturing chemists, as by all other manufacturers; and their adoption for the dispensing of drugs would do away with the ambiguity and inconvenience arising out of the use of two different sets of weights by manufacturing and dispensing chemists.

The substitution, therefore, of the pound avoirdupois for the pound troy, may be hailed as a sensible improvement; and the corresponding change in the ounce might be allowed to pass unquestioned. But

the change in the values of the drachm and scruple is less free from objection ; and the establishment of a new grain appears to me to introduce inconveniences greater than those which it is intended to remove.

The object of the *Pharmacopœia* Committee, in proposing to establish a new grain, seems to be this : to make the avoirdupois ounce divisible into 480 *integral* parts, like the troy or apothecaries' ounce. The latter, as everybody knows, contains 480 standard grains. But the avoirdupois ounce contains only 437.5 standard grains ; so that if this be divided, like the apothecaries' ounce, into drachms and scruples, each drachm will contain 54.6875 standard grains, and each scruple will contain 18.2291666.... standard grains.

These, then, will be the actual weights of the proposed new drachm and scruple. But, in order to make the scruple divisible into 20 grains, the drachm into 60, and the ounce into 480 grains, as heretofore, the Committee propose to establish a *new* grain, which shall be lighter than the standard grain, in the proportion of 91 to 100.

To the establishment of this new grain there are objections which seem to me deserving of consideration. The present standard grain has been formally established by Act of Parliament, being defined as the seven-thousandth part of the standard pound deposited in the Exchequer office. It is not only in actual use for medicines and the precious metals, and in scientific investigations, but has been in use for ages, and is known and understood both at home and in foreign countries as our standard grain. It will, of course, continue to be used by men of science in their experiments and calculations.

The establishment of a new grain to be used for drugs alone would have the effect of making diverse what is now common between medicine and other sciences. This will not be a mere temporary inconvenience ; it will occasion an ever-recurring ambiguity. When we meet with statements of weight in grains in medical, physiological, or chemical investigations, we may be left in doubt which kind of grain is meant, the standard or the new grain; and this is a doubt which calculation will not solve.

Besides, for the honour of medicine, is it advisable to sever any of its bonds of connexion with the more exact sciences? Shall we not be blamed for it by men of science? and shall we not be liable to incur ridicule, if, while remedying the ambiguity of the pounds and ounces, we create ambiguities of the same kind and greater in degree?

It may be added, as a minor objection, that the new grain, if it be the four-hundred-and-eightieth part of an ounce avoirdupois, will not be .91 of standard grain, but the long recurring decimal .911458333.... If the new grain be .91 standard grain, 480 new grains will not make exactly an ounce avoirdupois. The difference is unimportant in the dispensing of drugs, but not so in scientific investigations; and a *reform* involving such an error of calculation would do little credit to medical accuracy.

These are not the only objections to the proposed change. The new drachm and scruple will be different from the drachm and scruple heretofore used. The names will be preserved, but will not have the same meaning; and hence will arise further ambiguities and inaccuracies.

With regard to the drachm there will, moreover, be this strange inconsistency : it will be the eighth part of an ounce avoirdupois, and will therefore be exactly twice as heavy as another weight of the very *same name*, viz., the drachm avoirdupois, which is the sixteenth part of the same ounce.

One of the immediate consequences of the proposed change will be, that an entirely new set of brass weights will be required by every general practitioner and druggist in the kingdom ; all the old weights will become valueless.

Be it observed, that the inconveniences which have thus been pointed out are not the immediate consequence of the praiseworthy aim of the Committee to get rid of the confusion between the two ancient sets of weights—the troy and avoirdupois pounds and ounces ; they are not the *necessary* consequence of substituting these avoirdupois weights for the corresponding troy weights, but are the consequence of an endeavour to effect the division of the ounce avoirdupois into 480 integral parts. It seems to me that this object is not of so essential an importance as to justify the introducing new elements of confusion into our English system of weights.

It may, perhaps, be worth while to point out a plan by which all these inconveniences might be avoided. This may be done simply by ceasing to use the ounce in prescriptions ; of course, I mean the ounce in weight, not the fluid-ounce, which is a measure, and with which it is unnecessary to interfere. Let the quantities of solid substances be prescribed in drachms, scruples, and standard grains, such as are now in daily use. When larger quantities are required, they can be written in

drachms ; or, if of the largest kind, may be expressed by the pound of 7000 grains, which is an exact multiple of the drachm.

Perhaps a still better (and the simplest) plan would be, for all quantities less than a pound, to prescribe in grains alone—*in standard grains alone*. The calculations between large and small quantities would always be easy, because the standard pound is a large round number (7000) of grains. We should have weights of 100, 200, 500, and 1000 grains, such as are now occasionally used in scientific investigations. There would be no difficulty in writing our prescriptions. The small quantities, which more commonly occur in prescriptions, would require no alteration from our present forms, and for even the largest quantities the change would be easy. Five hundred grains (gr. d) is as easily written as  $\frac{5}{j}$ . Fifty, or a hundred, or a thousand grains, are likewise easily written, either in the ordinary figures, or as gr. l, gr. c, or gr. m.

As the grain would not be changed, *all the brass weights now in use for dispensing might still be used*. A single ordinary set of the small weights might be made to serve for dispensing any drug not exceeding 250 grains in weight. If any new weights were needed, they would be one of 300 grains, and one of 500 grains ; and these would only be required in cases in which ounce weights are now used. No other weights would be needed for dispensing and compounding on a moderate scale ; and if larger weights were needed, they would be the ordinary avoirdupois pound, half-pound, and quarter, which are in common use in every shop and most private houses, and which weigh respectively 7000, 3500, and 1750 grains.

As the intentions of the *Pharmacopœia* Committee have not yet been published *on authority*, my remarks may appear premature. But the intentions are well known; and to wait for their authoritative publication is to wait until it might be difficult or impracticable to have them reconsidered.

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